

HIE, concrete and the death of Cairngorm as a ski resort?

Description

While researching why the funicular was beams were built out of concrete rather than steel ([see here](#)), apart from being told that the beams should have been deeper, “tensioning” was mentioned. I didn’t appreciate the importance of what was being talked about at the time but then, after my last post ([see here](#)), this comment appeared:-

The tension exerted on the beam by the steel rods will vary a fair bit due to temperature. Not ideal in a place that sees such large changes in weather. Whilst I hope this approach works I’m not filled with confidence. I also wonder whether those scarf joints were designed upside down, the joint seems to be in tension rather than compression!

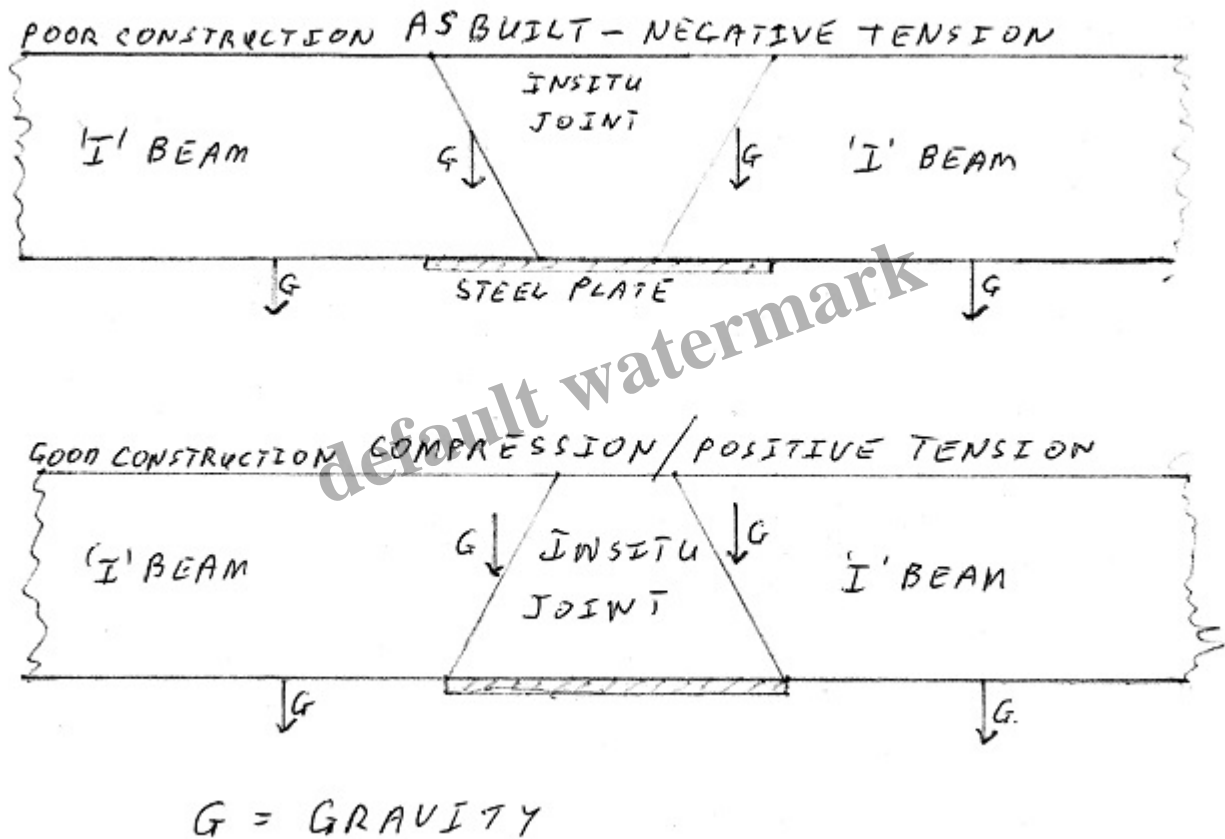
It suddenly dawned on me. Look at the next picture. The slope on the ends of the “I” beam appear the wrong way round.



The in-situ joint have several names including “scarf joint assemblies”

The only part of the structure being well supported is the wedge shaped insitu joint. The last few inches of the "I" beams have a steel plate underneath which, as I explained ([see here](#)), was too small to prevent the end of the beam cracking up but the joint also does nothing to prevent the beams pulling away from the piers. The whole structure is "in tension", not compression, due to the force of gravity.

If the end of the "I" beams had been manufactured the other way up, i.e. the top edge longer than the bottom, so that they sat on the piers rather than being suspended between them, then the more the weight put on the beam the more the compression/ strength would have increased.



This appears to be either a design fault by Crudens or a mistake on the part of manufacturer: since the "I" beams would have been moulds upside down ([see here](#)) it would be easy enough to get the shuttering for the ends the wrong way round. However, if the manufacturer got something wrong, Morrison Construction should have noticed the mistake and HIE could have sued them!

It appears more likely therefore that the problems with the joints are due to a fundamental design fault. That may partially help explain the £11m out of court settlement HIE reached with the successor

companies to Crudens and Morrisons (and Natural Retreats) this summer ([see here](#)). If so it begs the question, did HIE recover enough given the £25m repair bill?

The implications of the funicular structure being “in tension” for the future

HIE’s announcement on 13th October ([see here](#)) that the re-opening date for the funicular was being delayed yet again because “the tension of the ‘scarf joint assemblies’fell below the designated level” indicates the seriousness of the problem.

If the joints were under the correct tension when the funicular re-opened in January (Information Requests have been submitted to establish whether this was properly checked and the funicular was safe to use) that would suggest the impact of just six months use of the funicular was sufficient to make the whole structure unsafe. If so, there are serious questions to be asked about how long the current adjustments to the tension of the insitu joints/scarf joint assemblies will work.

There appear two possible engineering solutions:

- (1) An extra pier with all its accessories is added under each “I” beam to spread the load. This would require a new planning application, add yet more concrete to the mountain and is not 100% guaranteed to work, or (the better option);
- (2) Replacing all the “I” beams and insitu joints. In this case the only sensible option is to replace the concrete beams with the cheaper and lighter alternative, **STEEL**. ([see here](#))

The cost of either is likely to be considerable unless HIE can recover that through a further court case against COWI, the designers of the repairs, and the consultants who double checked the repair design. The Scottish Government is unlikely to be pleased to find out that they have wasted circa £25m on repairs/ strengthening that have not worked as expected and politically it would be very difficult for them to fork out yet more public money on a new “solution” for the funicular!

If the Scottish Government refuse further funding, HIE could be forced to permanently close the funicular, at which point a decision will have to be made over the future of the whole resort. None of this disaster would have happened if HIE had not been obsessed with the funicular and had been prepared to consider a modern and much cheaper lift system capable of carrying mountain bikers to mid-station as well as skiers.

What needs to happen for the winter

If HIE fails to re-open the funicular in the next few weeks that should not stop Cairngorm Mountain (CMSL) from providing for snowsports at Cairn Gorm (in the last couple of days there has been snow down to the car park).

HIE has provided CMSL with c£1m of snow making equipment, a snow factory and 13 snow cannons. There should be enough capacity in that equipment to provide snow cover from the bottom of the Cas

tow to the Day Lodge, IF IT IS USED TO MAXIMUM EFFECT WHEN CONDITIONS ALLOW! That is now down to staff at the ski centre who CMSL claimed to the Cairngorms National Park Authority “are best placed and have the knowledge of what is required to make the ski area better”:

The lower area within the planning application was already heather brashed in 2015. Existing people within this company are best placed and have the knowledge of what is required to make the ski area better, whilst maximising the opportunities for ecological diversity.

Extract from the planning application for the beginners ski area much of which has subsequently been turned into a mountain bike trail

Category

1. Cairngorms

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